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The power of words: How metaphorical framing shapes memory, cognition, and decision-making

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Abstract

Metaphorical framing exerts a strong influence on human cognition, decision-making, and memory through connecting abstract things to more tangible, daily experiences. This paper discusses the operation of metaphors in organising thought and shaping cognition through the theoretical frameworks of Conceptual Metaphor Theory, embodied cognition, and neural mechanisms such as Hebbian learning and mirror neurons. From foundational research to new experimental data, it looks at the operation of metaphors in the reconstruction of memory, formation of public opinion, and orientations of moral and political judgment. Metaphors engage emotional and sensorimotor systems, increasing memory retrieval and influencing perceptions of danger and policy preference. Cognitive and neural substrates of metaphorical framing parallel its general influence across a wide variety of psychological processes, and so the paramount value of circumspect application of metaphors in communication and decision-making. The paper concludes through a commentary on the limitations of culture and the requirement for carefully constructed future research to better clarify the operation of metaphor in shaping human thought.

Keywords: Metaphorical framing, conceptual metaphor theory, embodied cognition, hebbian learning, mirror neurons, language and memory, cognitive psychology, decision-making, risk perception, moral reasoning, political cognition, framing effects, public discourse, memory reconstruction, cultural models

Introduction

Background and Rationale

Language is a tool for us to help synthesize information, aiding the formation of thoughts, abstract concepts and formulating any type of logical reasoning. It is not just the medium through which we communicate with each other but so much more layered and complex. It is the basis of how we as individuals express ourselves and function. It is not just a mere exchange of words but it holds the power to shape our judgements and biases (e.g., Sapir-Whorf hypothesis; Whorf, 1956) ^[15]. Modern day psychology has helped us better understand the power of language and its underlying implications. This research paper is going to dissect how Metaphorical Framing Shapes Memory, Cognition and Decision making.

The term 'Frame Analysis' was coined by sociologist Irving Goffman in 1974 in his book, 'Frame Analysis', where he explained that every experience belongs to a frame, which organizes our experiences and helps us define how we take meaning from them (Goffman, 1974) ^[6]. Later, Charles J. Fillmore, a renowned linguist, developed 'Frame Semantics' and demonstrated that every word in every language is defined relative to a frame. He proposed that words are related to each other in a mental structure called a frame (Fillmore, 1982) ^[4].

A metaphor is a figure of speech that draws a comparison between two unrelated things. For example, Time is a thief. Metaphors are learnt unconsciously from our surroundings as we grow up (Metaphor theory, Lakoff & Johnson, 1980) ^[10].

Metaphorical framing is based on the idea that conceptual metaphors make sense in the context of more concrete or familiar situations. Conceptual metaphors are made up of primary metaphors, which could be 'more is up and less is down', and these primary metaphors come together to form conceptual metaphors like 'The student's marks are plummeting/ going down', when the student is performing poorly or 'Prices are going up',

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when the prices are increasing. The basis for primary metaphors stay largely universal through all cultures, regions, etc, but they may be expressed in different variations in every language (Kövecses, 2010) ^[8].

Theoretical Framework

Conceptual Metaphor Theory (CMT)

A conceptual metaphor forms when one idea (target domain) is understood in terms of the other (source domain). There are two main domains in conceptual metaphors, the source domain and target domain (Kövecses, 2010) ^[8]. The domain from which we draw the metaphorical expressions to understand the target domain is called the source domain, and the target domain is the domain on which the conceptual metaphor is based to comprehend it. In 'More Than Cool Reason: A Field Guide to Poetic Metaphor', Lakoff, G., & Turner, M. (1989) ^[11], the authors explain that metaphors do not just play an ornamental role in language, but their impact deeply impacts our cognition and the way we perceive the world. For example, in the conceptual metaphor 'Time is money', time, the target domain, is described to be valuable, precious and irreplaceable, just like money, the source domain. More metaphors like;

- You're wasting my time.
- This gadget will save you hours.
- I don't have the time to give you.
- How do you spend your time these days?
- That flat tire cost me an hour.
- I've invested a lot of time in her.
- You're running out of time.
- Is that worth your while?
- He's living on borrowed time.

(From "Metaphors We Live By" by George Lakoff and Mark Johnson, 1980) ^[10]

Use the same basis of logic, and draw a comparison between time and money. These metaphors solidify the relationship between time and money and establish in our mental lexicon that time, like money, is invaluable. Metaphors have the power to frame how we think by connecting two seemingly irrelevant things, to each other.

There are three types of Metaphors as described by Zoltán Kövecses, a Hungarian linguist, in his book, *Extended Conceptual Metaphor Theory*;

- Oriental metaphors
- Structural metaphors
- Ontological metaphors.

Oriental metaphors organise concepts in their spatial dimensions. They are rooted in physicality or the bodily experiences of a person. The metaphors feeling low or down, fall into this category of metaphors. Structural metaphors, on the other hand, are such that they describe one concept in terms of another. The phrases 'Love is war' or 'Time is money' are both examples of structural metaphors. The third and last category of metaphor as described by Kövecses, is the Ontological metaphor. These metaphors are those that treat abstract concepts as physical objects or substances to understand them. The metaphors 'Don't let him go' or 'He's carrying a lot of baggage' are both examples of ontological metaphors.

Embodied Cognition

Traditional cognitive science defines the mind to function in a modular system, which describes the architecture of the

mind to be composed of separate components, each compartment handling different cognitive functions like vision and language and memory. From this perspective, each module in our brain is relatively independent and processes information individually (Fodor, 1983) ^[5].

Embodied cognition challenges the traditional definition of cognition, which states that thinking is independent from perception and action. The theory of embodied cognition states that our thoughts are rooted in physical experiences, our perceptions and actions (Barsalou, 2008) ^[2]. It believes that thought is influenced by bodily states, actions and interactions. This theory relies on three key ideas: (1) Simulation, not abstraction, (2) Rooted to bodily experiences (but not necessarily) and (3) Situation in the real world.

The first idea is that embodied cognition is not abstract, and it is not something that can be detached from reality, but rather a simulation of past experiences in your mind. ('In cognitive neuroscience, the term "simulation" is used to denote the (usually automatic and unconscious) activation, in response to the observed behavior of another, of neural mechanisms associated with the production of like behavior in oneself' as states the Stanford Encyclopedia of Philosophy) For example, when someone thinks of an injection, they might think of a time where they got pricked by injection or even remember the shape and size of it. The second point helps us clarify that embodied cognition does not say that every thought is rooted in physicality; however, it opens up the possibility of the ties between cognition and bodily, introspective or emotional experiences. The last key idea says that thinking is highly contextual and depends on our environment and goals.

Psychologists in Yale experimented on subjects to study the impact of temperature on the perception of personality traits of an individual (Lawrence Williams and John Bargh, Yale, published in Science, 2008) ^[16]. Subjects briefly holding a warm cup of coffee were rated a target person more warmly (more generous or friendlier) than those holding a cold cup. This study suggests that bodily experience can unconsciously shape our perceptions of people. This experiment is also in line with common metaphors like 'She is a very warm person.'

A similar experiment that provides evidence for the concept of embodied cognition is an experiment performed at the University of Toronto that questioned if social exclusion literally feels cold (Zhong & Leonardelli, 2008) ^[18]. Subjects in this experiment were asked to think of a time when they were either socially rejected or socially accepted. The experimenters found that the people who recalled their social exclusion rated the room they sat in as colder than participants who remembered a time when they were socially accepted. Recalling the exclusion or acceptance affected the perceived temperature for the subjects.

These findings support the idea that embodied experiences influence abstract judgments through metaphor (Lakoff & Johnson, 1980) ^[10]. Thus, neural mechanisms tie in to metaphorical framings and how they can strengthen cognition.

Hebbian Learning & Neural Associations

Hebbian learning can be termed as a synaptic mechanism that suggests that synaptic connections between neurons strengthen when they are simultaneously active. Hebbian learning or Hebb's Rule was introduced by Donald Hebb in

his book 'Organization of Behaviour' where he also coined the famous phrase, "Neurons that fire together, wire together". This law explains how certain neurons fire together after their repeated connection with each other. This happens because the neural pathway that connects them becomes progressively stronger as the frequency of the synapses increases, gradually making the action or memory easier to reproduce. Hebb's work connects psychology with neuroscience, which has earned him the title of 'father of neuropsychology'.

The metaphorical and emotional implications of Hebbian learning can also be understood through the lens of classical conditioning. Classical conditioning occurs when a neutral stimulus gets associated with a conditioned stimulus that elicits a response, and as the association between them gets stronger, the neutral stimulus starts triggering a similar response. This replicates the concepts of Hebbian learning, which state, "Neurons that fire together, wire together".

This could be further understood with the example of warmth and its association with trust and affection. An individual perceives warmth and associates it with trust and affection because this experience lies with embodied cognition. The feeling of warmth (initially a neutral stimulus) repeatedly occurs alongside a trusted figure which makes them feel safe (unconditioned stimulus). Over time, the brain registers these associations of trust and affection with feeling warm, and these synapses strengthen (Hebbian learning). These strong neural connections embed themselves in our cognitive and solidify themselves as metaphorical framings.

This concept can be further exemplified by the presence of mirror neurons. Mirror neurons respond to actions that we observe in others. They fire in the same way when we watch or when we recreate that action ourselves. Through mirror neurons, we understand every action's purpose, helping us to go beyond surface-level observation. The neural substrates activated in mirror neurons activate vicariously while witnessing any other action or sound to help us make sense of the world. So, we not only make neural associations with first-hand experiences but also make them by observing and vicariously living. The presence of mirror neurons amplifies the role of Hebbian learning in our lives as learning is manifested everywhere (Rizzolatti & Sinigaglia, 2008; Keysers & Gazzola, 2014) ^[13, 9].

Metaphorical Framing and Memory Language and Memory Reconstruction

To study the impact of language on memory reconstruction, we will study an experiment conducted by Loftus, E. F., & Palmer, J. C. (1974) ^[12] - Reconstruction of automobile destruction. The study aimed to test their hypothesis that the language used in eyewitness testimonies can alter memory. 45 students from the University of Washington participated. The experiment consisted of 5 conditions in total, only 1 condition experienced by each participant. Seven short videos of staged car crashes at speeds of 20, 30 or 40mph were shown, and participants were asked to estimate the speeds of cars using different verbs like 'hit' or 'smashed'. When verbs like 'smashed' were used instead of 'hit', the speed participants reported was higher. On a retest a week later, the subjects who had used a verb like smash, were more likely to say yes to the question, "Did you see any

broken glass?", even though there was no broken glass present in the videos. All the results align with the view that questions asked subsequent to the event can distort or reconstruct someone's memory of the event.

The findings of the experiment suggest that memory is highly flexible and all the information exposed to an individual consequent to an event and recalling it, marks the memory of that event. Original memory can be reconfigured, changed or supplemented.

This experiment drew concerns about how the misleading wording of leading questions (questions that prompt a certain answer, Oxford Languages) can induce visual imagery and distort memory. The character of the question may also evoke the confabulation effect in people, where they start creating false memories, not deliberately, but with the intention of filling in gaps within memory. It is a memory error consisting of the fabrication of facts or the distortion of memory. The confabulation effect can be abused by courts and police officers to get certain testimonies out of people who are traumatised or unsure about how the event played out. The wording of a question can shape and alter someone's memory. This experiment highlighted the unreliability of eyewitness testimonies and how police and courts handle questioning.

Metaphors and Episodic Memory

Metaphors highlight certain aspects, usually emotional connotations, attached to an experience. By doing so, they shape how memories are stored and recalled as each experience gets associated with a specific schema. Metaphorical framing can increase memory retention compared to isolated facts, as it influences which detail of a memory gets encoded and recalled by supplementing the information with meaningful representations. (Cox, 2016; Allbritton, 1995) ^[1].

Metaphors in Risk Perception and Decision-Making Framing Effects in Public Discourse

Public opinion is dependent on the use of metaphors to describe public issues. The chosen language does not simply describe a problem; it shapes public attitude, determines which solutions seem reasonable and constructs the boundaries around the debate of public policies.

One powerful example is the metaphor of war analysed in David Davenport's work. The metaphor 'War on Drugs' casts drug use in a language of war, and its policymakers frame the narrative as a battle between good and evil, trying to increase their own executive powers and influence. Once we attach something to the word 'War' the deliberation of affairs is lost, and the policies automatically start requiring aggressive tactics. This framing also positions drug users as evils that need to be defeated instead of citizens who require medical and psychological support. Wars evoke a sense of national unity in people, and this emotion is manipulated to criminalise a defenceless enemy. 'War on drugs' is an example of risk framing where risks are communicated with the intention of exaggeration or purposely misleading. Metaphors influence public policies. It is important to acknowledge the influence of metaphors and learn how to shift narratives so we can work on public issues from a standpoint of public health issues needing prevention and care rather than them being a 'war' requiring imprisonment and harsh policing.

Experimental Evidence

Public discourse is not neutral and relies on metaphors that frame how issues are acted upon. As Lakoff and Johnson

argue in their conceptual metaphor theory, metaphors shape how we perceive reality. When political leaders or media outlets frame an issue through metaphor, they also change the risks we perceive with it.

A clear case of this is witnessed in Thibodeau and Boroditsky's (2011) ^[11] study on crime framing. When participants were told that "A beast preying on the city", they overwhelmingly suggested punitive decisions like harsher sentencing and stronger law enforcement. By contrast, when the same statistics were framed but described as "A virus infecting the city", participants suggested more systematic reforms like finding its root causes or improving education and poverty. The underlying statistics did not change, but people's perception of the event did - as a matter of control and punishment or treatment and prevention.

The same rhetoric can be seen in politics, where President Donald Trump described undocumented immigrants as 'animals'. Using a metaphor that frames immigrants as dangerous, predatory and threats that are outside the bounds of humanity. Much like Thibodeau and Boroditsky's 'beast' evokes hostility, Trump's language narrowed the range of acceptable responses to policing, detention and expulsion instead of more humanitarian approaches.

The comparison shows how metaphors affect public discourse and collective decision-making. A single metaphor can change the narrative.

Metaphors and Moral/Political Reasoning

Morality as Cleanliness

Metaphors not only shape political discourse but also influence how individuals experience morality. A key example of this is the "Morality is purity" metaphor explored by Zhong & Liljenquist (2006) ^[19], where research shows that after recalling or committing moral transgressions, people feel a strong urge to physically clean themselves. This phenomenon is also sometimes called the "Macbeth effect", and it reflects how mental moral conflict can map onto bodily experiences of feeling dirty or contaminated.

The influence of this metaphor also stretches across our emotional responses, where immoral acts are seen as contaminating or dirty. This mental frame elicits a strong reaction of disgust and moral contempt. Following this logic, the act of cleaning oneself may reduce the feeling of guilt and restore a sense of purity.

The metaphor "Morality is purity" further solidifies the notion that metaphors are not just linguistic devices but are rooted in embodied cognitive structures.

Emotional and Cognitive Resonance

Not all metaphors exert the same amount of persuasion. The influence of metaphors on us depends on its emotional valence, imageability, embodiment and neural reinforcement.

Metaphors with a stronger emotional valence resonate with us more deeply. For example, framing crime as a 'beast' evokes responses of fear, urgency and emergency, making the use of punitive policies feel more intuitive. On the contrary, using the word 'virus' for the same, produces feelings of openness towards systematic reforms. Both these metaphors draw emotional associations, evoking fear and urgency or care and containment.

Imageability, or the visual imagery of metaphors, influences memorability. A phrase like 'War on drugs' conjures images

of enemies, battlefields, violence and is more imaginative than a phrase like 'drug policy reform' that is neutral.

Embodied cognition is equally important for the effectiveness of metaphors. Embodied experiences are universally felt and ingrained, and metaphors that rely on the concept feel innate. For example, embodied cognition explains why purity metaphors in morality evoke the feeling of disgust or relief as they map abstract concepts and root them back into physicality.

Finally, Hebbian Learning and mirror neurons explain why embodied metaphors gain persuasive force through their repetition or observation. When neural pathways connecting bodily experiences such as warmth co-occur with trust, they strengthen. Over time, these metaphors turn into a neurologically entrenched association due to first-hand experience or vicarious observing. Together, these embodied metaphors become extremely influential.

Metaphors that activate all these levels of our cognition - emotion, imagination, and embodied experience, are most likely to be the ones to shape our memory, guide our reasoning and influence our decision making. These metaphors are not only memorable but also more persuasive than plain language.

Discussion

Broader Implications

What makes metaphorical framing is its ability to restructure public opinion. Research on framing shows us how metaphors can evidently shift what societies prioritise, dramatise and build narratives around, being utterly oblivious to this shift (Thibodeau & Boroditsky, 2011) ^[11]. Metaphors are not just a string of words used by poets; they set agendas, shape dialogue and guide how humanitarian conflicts are resolved. Understanding metaphor's influence on communication is therefore essential for being more critical of the information that guides our decisions.

Limitations and Future Directions

The understanding of metaphors depends heavily on cultural models. For example, a metaphor like 'Time is money', which reflects values of productivity and efficiency in Western culture, may not follow its logic in cultures that practice continuity and a cyclic understanding of time. Therefore, metaphorical framing cannot be applied universally (Kövecses, 2010) ^[8].

Another limitation of this theory is that a lot of the current research is based on correlational evidence or very limited experimental designs. This makes it difficult to differentiate between metaphor use and the shifts in cognition or behaviour. The observed cases, in many instances, may be influenced by external variables. This further weakens the claim of the direct power of metaphors to shape thought.

To overcome these obstacles, we will need stronger and more diverse methods of experimentation in studies. Methods like Neuroimaging can be used - shedding light on what happens in the brain when metaphors are used. Cross-cultural experiments are also important for us to methodically categorise what is universal from culture-specific experiences. These approaches could deepen both the theory and practicality of metaphor research, making the concept more credible and universally accurate.

Conclusion

Metaphors are not just ornamental, they structure the way we think, act and decide. The frames used in media and politics, and everyday life shape our collective

understanding, guiding our decisions, often without us realising. That is why using metaphors responsibly is essential, as they are tools that influence society, for better or for worse.

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